Today
- Review rotation invariant mesh coordinates
- Deformation transfer, Sumner et al.
- Presentation by Ryan

Rotation invariant coordinates
- Local description of one ring neighborhood

Rotation invariant coordinates
- Length and angles between tangent vectors (first discrete form)

Rotation invariant coordinates
- Distance to tangent plane (second discrete form)
**Rotation invariant coordinates**
- Given local frame, can reconstruct one ring neighborhood

**Surface equations**
- Coefficients given by discrete forms
- Linear system of equations with local frames as unknowns
  \[
  \begin{align*}
  b_1 & = (T_{c1}^{1,1} + 1)b_0 + \Gamma_{c1}^{1}b_0 + A_{c1}^{1}N_0 \\
  b_2 & = (T_{c2}^{2,2} + 1)b_0 + \Gamma_{c2}^{2}b_0 + A_{c2}^{2}N_0 \\
  N_1 & = T_{c1}^{1,1}b_1 + T_{c2}^{2,2}b_2 + (A_{c1}^{1} + A_{c2}^{2})N_0
  \end{align*}
  \]

**Geometry difference equations**
- Linear system of equations with vertex positions as unknowns
  \[
  \Delta \mathbf{x} = \mathbf{x}_0 + \mathbf{F}_N\mathbf{N}_0 = \begin{pmatrix} (\Delta z_1, 0) \end{pmatrix} b_0 + \begin{pmatrix} (\Delta z_2, 0) \end{pmatrix} b_0 + \begin{pmatrix} (\Delta z_3, 0) \end{pmatrix} b_0 + \begin{pmatrix} 0 \end{pmatrix} b_0
  \]

**Surface editing**
1. User fixes few local frames, vertex positions
2. Solve surface equations for local frames
3. Solve geometry difference equations for vertex positions